REMARKS

The Official Action mailed September 12, 2002 has been received and its contents carefully noted. Claims 109-140 are pending in the present application and claims 109-140 has been amended. Claims 109-140 are now pending in the present application, of which claims 109, 113, 117, 121, 125, 129, 133 and 137 are independent.

Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on December 27, 2000, July 3, 2001 and June 28, 2002. However, Applicant has not received acknowledgment of the Information Disclosure Statements filed on June 18, 2002. A further Information Disclosure Statement is submitted herewith and careful review and consideration of this Information Disclosure Statement is requested.

Paragraph 1 of the Official Action objects to claims 109-140 due to the use of the abbreviation "EL." In response, the Applicant has amended the claims to recite "electroluminescence" instead of "EL." Reconsideration of the objection is requested.

Paragraph 3 of the Official Action rejects claims 109-116, 121-128, and 133-140 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,550,066 to Tang et al. in view of U.S. Patent No. 5,117,299 to Kondo et al. The Applicants respectfully traverse the rejection because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2143-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of

one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab,* 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The prior art, either alone or in combination, does not teach or suggest all the features of the independent claims. Specifically, Tang and Kondo do not teach or suggest the feature of independent claims 109, 113, 121 and 125 of the present invention that an insulating layer comprising diamond-like carbon (DLC) is formed over an insulating layer comprising organic resin.

Tang discloses an electroluminescence display comprising a thin film transistor T1, an insulating gate material 42, an insulating layer 52 (layer formed between 41 and ITO) applied over the entire surface of the device, a transparent electrode material 72, and an organic electroluminescent layer 82 in Figs. 1 and 3. The Official Action asserts that the insulating gate material 42 and the insulating layer 52 of Tang correspond with the first and second insulating layers of the present invention, respectively. The Official Action concedes that Kondo "fails to disclose an organic resin based material for the first insulating layer as well as a diamond like carbon (DLC) material for the second insulating layer" (p. 3, Paper No. 22). In other words, the Official Action concedes that the insulating gate material 42 of Tang does not comprise organic resin and the insulating layer 52 of Tang does not comprise DLC. The Official Action attempts to apply Kondo in order to fill the gaps in the disclosure of Tang.

Kondo discloses a hard carbon film as an insulator layer used in a metal-insulator-metal (MIM) device (col. 4, lines 9-10 and 25-27). The Official Action asserts that it would have been obvious to substitute the insulating gate material 42 of Tang with the hard carbon film of Kondo (p. 3, Paper No. 22).

The independent claims of the present invention recite, in part, an EL device comprising a TFT over a substrate, and a DLC insulating layer over an organic resin insulating layer. At best, Tang teaches a TFT T1 over a substrate 41 and an insulating layer 52 on an insulating gate material 42, both of which are preferably formed of silicon dioxide (col. 6, line 63; col. 7, lines 17-18). Kondo teaches forming a DLC insulating

layer in a MIM device. Tang does not contemplate modifying the silicon dioxide composition of the insulating layer 52 or the insulating gate material 42. Kondo says nothing about forming a DLC insulating layer over an organic resin insulating layer, or use of such a DLC insulating layer in an EL display device.

In the "Response to Arguments" section, the Official Action attempts to argue that the modification to Tang would have somehow been motivated by seeing the "advantage of an DLC film as an insulating layer as shown by Kondo" (p. 5, Id.). This argument appears to employ hindsight and lacks an indication why one with ordinary skill in the art would have been motivated to substitute the silicon dioxide insulating layer 52 of Tang with a DLC film used in a MIM device.

As noted in previous responses, the hard carbon film of Kondo is provided as a part of the switching device. Why would a skilled artisan remove the insulating layer 52 of Tang, and then choose to replace it by picking and choosing only the DLC insulating film of the Kondo MIM device? Even assuming motivation could be found, the Official Action has not given any indication that one with ordinary skill in the art at the time of the invention would have had a reasonable expectation of success when combining Tang and Kondo.

The Official Action further asserts that it would have been obvious to use an organic resin for the insulating layer because "use of one conventional material over another merely depends on the desire of the manufacturer and/or the availability and practicality of the material for the chosen manufacturing process" (p. 3, Id.). In accordance with MPEP § 2144.03, the Applicant respectfully traverses the above-referenced assertion and requests that the Examiner cite references in support of their position. The Applicants respectfully submit that use of an organic resin for the insulating layer in combination with the other features of the independent claims is not conventional and would not have been known to one with ordinary skill in the art at the time of the invention.

In addition, claims 113 and 125 recite an insulating layer comprising silicon nitride. A silicon nitride layer formed over a thin film transistor is not disclosed in either Tang or Kondo, either alone or in combination. The Official Action again asserts that it would have been obvious to substitute the Tang silicon dioxide insulating film with

silicon nitride film because "it is a common practice in the art" and "use of one conventional material over another merely depends on the desire of the manufacturer" (p. 5, Id.). Again in accordance with MPEP § 2144.03, the Applicant respectfully traverses the above-referenced assertion and requests that the Examiner cite references in support of their position. The Applicants respectfully submit that use of a silicon nitride insulating film in combination with the other features of the independent claims is not conventional and would not have been known to one with ordinary skill in the art at the time of the invention.

In the present application, it is respectfully submitted that the prior art of record, alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Accordingly, reconsideration and withdrawal of the rejection of claims 109-116, 121-128, and 133-140 under 35 U.S.C. § 103(a) is in order and respectfully requested.

Paragraphs 9 of the Official Action reject claims 109-132 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 90, 91 and 97 of U.S. Patent No. 6,115,090. Also, claims 109-132 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending application Serial No. 09/295,397. Claims 90, 91 and 97 of the '090 patent and claim 8 of the '397 application do not disclose a first insulating layer comprising organic resin, a second insulating layer comprising DLC over the first insulating layer, and a third insulating layer comprising organic resin over the second insulating layer. It is respectfully submitted that absent a disclosure or suggestion of the above-referenced features a rejection under the doctrine of obviousness-type double patenting cannot be maintained. Reconsideration is requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,

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MARKED-UP VERSION OF THE AMENDED CLAIMS

109. (Amended) An [EL] electroluminescence display device comprising:

at least one thin film transistor formed over a substrate;

a first insulating layer comprising organic resin formed over said thin film transistor;

a second insulating layer comprising DLC formed over said first insulating layer;

a pixel electrode formed over said second insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said second insulating layer.

110. (Amended) An [EL] electroluminescence display device according to claim 109, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

111. (Amended) (Amended) An [EL] electroluminescence display device according to claim 109, wherein said first insulating layer has a planarized surface.

112. (Amended) An [EL] electroluminescence display device according to claim 109, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

113. (Amended) An [EL] electroluminescence display device comprising:

at least one thin film transistor formed over a substrate;

a first insulating layer comprising silicon nitride formed over said thin film transistor;

a second insulating layer comprising organic resin formed over said first insulating layer;

a third insulating layer comprising DLC formed over said second insulating layer;

a pixel electrode formed over said third insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said third insulating layer.

114. (Amended) An [EL] electroluminescence display device according to claim 113, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

115. (Amended) An [EL] electroluminescence display device according to claim 113, wherein said second insulating layer has a planarized surface.

116. (Amended) An [EL] electroluminescence display device according to claim 113, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

117. (Amended) An [EL] electroluminescence display device comprising:

at least one thin film transistor formed over a substrate;

a first insulating layer comprising organic resin formed over said thin film transistor;

a second insulating layer comprising DLC formed over said first insulating layer;

a third insulating layer comprising organic resin formed over said second insulating layer;

a pixel electrode formed over said third insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said third insulating layer.

118. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

119. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said first insulating layer has a planarized surface.

120. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

121. (Amended) An [EL] electroluminescence display device comprising:

an active matrix region and a driver region formed over a substrate,

wherein said active matrix region comprises:

at least one thin film transistor;

a first insulating layer comprising organic resin formed over said thin film transistor;

a second insulating layer comprising DLC formed over said first insulating layer;

a pixel electrode formed over said second insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said second insulating layer.

122. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

123. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said first insulating layer has a planarized surface.

124. (Amended) An [EL] electroluminescence display device according to claim 117, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

125. (Amended) An [EL] electroluminescence display device comprising:

an active matrix region and a driver region over a substrate,

wherein said active matrix region comprises:

at least one thin film transistor;

a first insulating layer comprising silicon nitride formed over said thin film transistor;

a second insulating layer comprising organic resin formed over said first insulating layer;

a third insulating layer comprising DLC formed over said second insulting layer;

a pixel electrode formed over said third insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said third insulating layer.

126. (Amended) An [EL] electroluminescence display device according to claim 125, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

127. (Amended) An [EL] electroluminescence display device according to claim 125, wherein said second insulating layer has a planarized surface.

128. (Amended) An [EL] electroluminescence display device according to claim 125, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

129. (Amended) An [EL] electroluminescence display device comprising:

an active matrix region and a driver region over a substrate,

wherein said active matrix region comprises:

at least one thin film transistor;

a first insulating layer comprising organic resin formed over said thin film transistor;

a second insulating layer comprising DLC formed over said first insulating layer;

a third insulating layer comprising organic resin formed over said second insulating layer;

a pixel electrode formed over said third insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said third insulating layer.

130. (Amended) An [EL] electroluminescence display device according to claim 129, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

131. (Amended) An [EL] electroluminescence display device according to claim 129, wherein said first insulating layer has a planarized surface.

132. (Amended) An [EL] electroluminescence display device according to claim 129, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

133. (Amended) An [EL] electroluminescence display device comprising:

a switching element comprising at least one thin film transistor formed over a substrate;

a first insulating layer comprising organic resin formed over said switching element;

a second insulating layer comprising DLC formed over said first insulating layer;

a pixel electrode formed over said second insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said second insulating layer.

134. (Amended) An [EL] electroluminescence display device according to claim 133, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

135. (Amended) An [EL] electroluminescence display device according to claim 133, wherein said first insulating layer has a planarized surface.

136. (Amended) An [EL] electroluminescence display device according to claim 133, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.

137. (Amended) An [EL] electroluminescence display device comprising:

a switching element comprising at least one thin film transistor formed over a substrate;

a first insulating layer comprising organic resin [for providing] having a flattened upper surface, formed over said switching element;

a second insulating layer comprising DLC formed over said first insulating layer;

a pixel electrode formed over said second insulating layer, said pixel electrode electrically connected to said thin film transistor; and

a light-emitting layer formed over said second insulating layer.

138. (Amended) An [EL] electroluminescence display device according to claim 137, wherein said organic resin is selected from the group consisting of polyimide, polyimideamide, polyamide, acryl and epoxy.

139. (Amended) An [EL] electroluminescence display device according to claim 137, wherein said first insulating layer has a planarized surface.

140. (Amended) An [EL] electroluminescence display device according to claim 137, wherein said [EL] electroluminescence display device is incorporated into an electric apparatus selected from the group consisting of a portable information terminal, a head mount display, a portable telephone, a video camera and a projector.